

## *Chapter 11*

# **Organic Farming Practices in Palms and Cocoa: Field Level Scenario and Future Strategies**

☆ *D. Jaganathan, C. Thamban, S. Jayasekhar, C.T. Jose, V. Krishnakumar, P. Anithakumari and K.P. Chandran*

### **1. Introduction**

Plantation crops like coconut, arecanut, cocoa, coffee, tea and rubber play an important role in social, cultural and economic life of people in India. Coconut, arecanut and cocoa are the important perennial crops which are largely grown in south India especially in the states *viz.*, Kerala, Karnataka, Tamil Nadu and Andhra Pradesh. India is one of the major producers of coconut in the world and about 12 million people are dependent on coconut farming and its allied activities. India has produced 21,665 million nuts in the year 2014 from an area of 2.14 million ha with a productivity of 10,122 nuts per hectare. Kerala, Karnataka, Tamil Nadu and Andhra Pradesh are the four major states which account for 88.8 per cent of area and 91.2 per cent of India's production (CDB, 2015). Arecanut is grown in parts of Karnataka, Kerala, Assam, Meghalaya, West Bengal, Tamil Nadu and Andaman and Nicobar Islands. India is the largest producing country with a production of 7.46 lakh tonnes from an area of 4.50 lakh ha (DASD, 2014). Karnataka, Kerala and Tamil Nadu are the major southern states where arecanut is cultivated in an area of 3.20 lakh ha with a production of 5.97 lakh tonnes. (DASD,2014). Cocoa is considered to be the food of God and is native to Amazon region of South America. Cocoa was introduced in India as a mixed crop/intercrop in coconut and arecanut plantations during 1970s. At present, it is cultivated in 65,500 hectares in India as

component crop in coconut, arecanut and oil palm plantations with a production of 13,400 tonnes (DCCD, 2014). It is mainly cultivated in four southern states *viz.*, Karnataka, Kerala, Tamil Nadu and Andhra Pradesh. There is a tremendous scope for area expansion in cocoa because of heavy demand in Indian chocolate industry and confectionaries which is portrayed as 60,000 mt for the year 2025.

Research on coconut, arecanut and cocoa started in India during 1916, 1956 and 1970, respectively which resulted in generation of large number of viable technologies *viz.*, improved varieties/hybrids, agro techniques, cropping/farming system, pest and disease management, processing and value addition. Diverse production systems had been practiced by farmers due to diverse agro-climatic and socio economic conditions across different parts of the country. Organic farming is getting prominence in various parts of India since 1990s, but no systematic and institutional work had happened till 2000. National Programme for Organic Production (NPOP) was launched in May, 2000 by the government with the objective of promoting organic farming in India. Since then, India is showing rapid progress in organic sector. In 2010-11, 6.0 lakh hectares of cultivated land were under certified organic and another 1.75 lakh hectares were under conversion (NCOF, 2011). In India, National Steering Committee comprising of Ministry of Commerce, Ministry of Agriculture, Agricultural and Processed Food Export Development Authority (APEDA), commodity boards and various other government and private organizations associated with the organic movement is monitoring the overall organic activities under the National Programme for Organic Production. APEDA is the coordinating agency for organic food production and export under the brand name "India Organic". The steps involved in certification are, registration of the producers and processing industries, provision of basic information on the crop and farm, inspection and verification of the field and processing unit, inspection of production methods and practices by the inspector of the certifying agency.

Realizing the potential of organic farming, National Project on Organic Farming was started in the year 2004. In India, the demand for organic produce increases year after year particularly in international trade market. Organic products produced in India are tea, spices, fruits and vegetables, rice, coffee, cashew nuts, oilseeds, wheat, pulses, cotton and herbal extracts. Products with potential in the domestic market are fruits, vegetables, rice and wheat, while those in the export market are tea, rice, fruits and vegetables, cotton, wheat and spices. Organic farming is a unique production management system which promotes and enhances agro ecosystem health, including bio-diversity, biological cycles and soil biological activity and this is accomplished by using on-farm agronomic, biological and mechanical methods in exclusion of all synthetic off-farm inputs (FAO, 1993). Organic farming practices are gaining importance among farmers, trainers, entrepreneurs, policy makers, agricultural scientists, processors and extension personnel for varied reasons such as it minimizes the dependence of external inputs, thus, not only reduces the cost of cultivation but also safeguard as well as preserve quality of resources and environment. ICAR institutes, State Agricultural Universities (SAUs), Krishi Vigyan Kendras (KVKs), Non Governmental Organizations (NGOs), State Department of Horticulture / Agriculture and other government and private agencies have started

advocating organic farming practices in horticultural crops including coconut, arecanut and cocoa.

In this context, systematic research for evolving organic package of practices for coconut, arecanut and cocoa has started recently at ICAR- CPCRI and different centres of the All India Coordinated Research Project on Palms keeping in view the sustainability aspects and other benefits. Many farmers cultivating coconut, arecanut and cocoa have started adopting organic farming practices due to various socio-economic and other related factors. In this chapter, field level scenario of organic farming practices in these crops adopted by such farmers is discussed in detail and future strategies for promotion of organic farming are outlined.

## 2. Socio-economic and Farming Details

An analysis of organic farming practices in coconut in south India conducted by Jaganathan *et al.* (2013) revealed that around 67 per cent of the farmers had less than two ha, with nearly 80 per cent having more than 15 years of experience in coconut cultivation. Around 63 per cent farmers maintained any livestock component in their farm, which is an integral part of organic farming. Only 12 per cent of the cultivators maintained any farm records, whereas, 23 per cent of farmers carried out soil testing as a basis for nutrient management and organic certification was adopted by less than 3 per cent of the farmers included in the study. In the case of arecanut (Jaganathan *et al.*, 2014), 58 per cent of the farmers had less than two ha area cultivated with arecanut with 80 per cent having more than 15 years of experience in cultivation. Around 67 per cent maintained livestock component in their farms, while about 30 per cent of the farmers were found to maintain farm records. Soil fertility evaluation was done by 28 per cent of the farmers. Certification for organic farming was taken up only 3 per cent of the farmers surveyed. Majority of cocoa farmers (> 60 per cent) had less than two ha area under the crop and more than three fourth of farmers had livestock component in their farms. It was noticed that 30 per cent of farmers maintained farm records and soil testing was done by around same percentage of farmers. Organic certification was taken up by five per cent (Jaganathan *et al.*, 2015) of the farmers surveyed.

## 3. Adoption of Organic Farming Practices

In the conventional farming, the farmers depended heavily on external agencies for inputs like planting materials, fertilizers, pesticides *etc.* Moreover they had to wait for long time for getting the inputs for use in their farms. Farmers are becoming more aware about the ill effects of chemical farming on the health of human beings. The indiscriminate use of chemicals not only polluted the soil, water and air but also affected the health of human beings. This changed their mindset to go for organic farming practices and made them conscious of 'concern for human health'. The analysis of different reasons for adopting organic farming practices, in general, revealed soil and human health, economic as well as social issues as the major ones. Most of the farmers surveyed felt that 'maintenance of soil fertility' was very much necessary. Concern for human health, minimizing the environmental pollution, use of traditional farming practices, minimizing the use of external inputs, reducing the



**Figure 11.1: Mixed Cropping in Coconut Garden.**



**Figure 11.2: Growing Leguminous Crop in Coconut Garden.**

production cost, efficient use of locally available resources, influence of institutions and other farmers were some of the other aspects considered by the farmers to change into organic farming. Growing of various intercrops for maintaining crop diversity and year round income generation, growing of green manure crops and,



**Figure 11.3: Mixed Cropping in Arecanut Garden.**



**Figure 11.4: Mulching using Cocoa Leaves.**

use of green leaf manure for increasing soil fertility, mulching the plant basins and growing of cover crops for soil and moisture conservation *etc.* were the major agronomic practices adopted by the farmers who switched over to organic farming.

Intercrops like cocoa, nutmeg, banana and black pepper were mostly adopted by farmers of Coimbatore district (Tamil Nadu state) and Kozhikode district (Kerala state) because of suitable agro climatic and socio economic factors. Tuber crops and vegetables were mostly found in Thiruvananthapuram district (Kerala state).

Fodder crops, lemon *etc.* were found in Tumkur district (Karnataka state). Majority of farmers in Thanjavur district (Tamil Nadu state) did not cultivate any intercrop as they felt intercultural operations would be difficult. Mulching was practiced using residues of coconut, banana, cocoa *etc.* to conserve the soil and water. Green manure crops like sun hemp (*Crotalaria juncea*) and Kolinji (*Tephrosia purpurea*) were raised by the farmers for enriching the soil fertility. Green leaf manure crops like glyricidia, neem leaves, calotropis *etc.* were also used by farmers. Leguminous crops like *Stylosanthes gracilis*, *Calopogonium mucunoides*, *Vigna unguiculata* *etc.* were used as cover crops to prevent soil erosion and for enriching the soil fertility.

In order to maintain or improve soil fertility, use of organic inputs produced/prepared at the farm itself was resorted to by the farmers. Various crop residues, farm yard manure, cow dung slurry, vermicompost, ash and poultry manure were found to be the major organic inputs in organic cultivation. Crop residues of coconut, banana, cocoa and other weeds were used as organic matter for enriching the soil fertility. Organic inputs *viz.*, neem cake, neem based insecticides, biofertilizers, poultry manure, sheep manure *etc.* were the major inputs which were purchased from external sources for use in crop production in the organic farms.

#### 4. Knowledge on Organic Farming Practices

Knowledge refers to the extent of information possessed by the farmers about organic farming. It is an important variable which will influence the adoption of organic farming practices. Majority of farmers cultivating coconut (68 per cent), arecanut (78 per cent) and cocoa (68 per cent) had medium level of knowledge about organic farming practices. The knowledge level of farmers on green manures, oil cakes, intercropping, mulching and vermicomposting was fairly



Figure 11.5: Pruning of Cocoa Plants.

high when compared to the knowledge on bio-control agents, botanical pesticides and bio-fertilizers. This warrants for conducting capacity building programmes *viz.*, trainings, exposure visits, method demonstration with respect to botanical pesticides, bio-fertilizers and bio-control agents in order to improve the knowhow of farmers which will result in better adoption.

## 5. Constraints in Organic Farming

Non availability of labour, non availability of quality organic inputs, lack of knowledge about organic farming practices, high cost for transporting organic inputs from outside the farm, lack of specialized markets for organic produces, high labour wages, low yield and profit during conversion period, lack of farmers' cooperatives for marketing, lack of standard package of practices for organic farming, lack of local certification agencies, and inadequate subsidies are the major constraints expressed by the farmers in adopting organic farming. Conventionally, prophylactic methods rather than curative methods were adopted for management of pests and diseases. Organic farming demands high technical know-how especially for pests and diseases management. Among the technical/extension constraints, difficulty in controlling pests and diseases by organic methods was expressed by majority of farmers. High cost for transporting organic inputs was the major one under economic constraints. For transporting inputs like farm yard and poultry manures, *etc.* vehicles are to be hired and the cost to be incurred for their application was also high. Farmers also felt that labour wages for weeding, and other cultural operations, irrigation *etc.* was also high, but the economic return for the produces remained more or the less during different years. Low yield and profit during conversion period was felt by farmers.

## 6. SWOT Analysis of Organic Farming

An attempt was made to analyze the strength, weaknesses, opportunities and threats (SWOT) in terms of farmers' and institutional perspective for adopting organic farming in coconut, arecanut and cocoa.

### 6.1. Farmers' Perspective

<i>Strengths</i>	<i>Weaknesses</i>
☆ Easy to adopt since it is often close to existing practice	☆ Labour intensive especially in initial phase
☆ Closely related to risk averse strategies of farmers	☆ Inadequate extension services
☆ Helps in developing local and traditional knowledge systems	☆ Non availability of specialized markets
☆ Local resources can effectively be used	☆ No demand and no premium price for organic produce
☆ Recycling and utilization of farm wastes	
☆ Free from risk of pesticides residues	
☆ Less dependency for external inputs which reduces the debt of farmers	
☆ Participatory farming	
☆ Build up of predators, natural enemies in the perennial system	

<i>Opportunities</i>	<i>Threats</i>
<ul style="list-style-type: none"> <li>☆ Possibility for sustainable agriculture</li> <li>☆ Creation of new on-farm income generating opportunities</li> <li>☆ Possibility for premium prices in future if certified</li> <li>☆ Opportunities for greater social contacts through meetings, training <i>etc.</i></li> </ul>	<ul style="list-style-type: none"> <li>☆ Belief in modernization</li> <li>☆ Peer group ridicule</li> <li>☆ Subsidy for inorganic farming</li> </ul>

## 6.2. Institutional Perspective

<i>Strengths</i>	<i>Weaknesses</i>
<ul style="list-style-type: none"> <li>☆ Donor agencies attracted to organic farming projects</li> <li>☆ Organic farming is to reduce the poverty among small and marginal farmers</li> <li>☆ Government is encouraging organic farming under Mission for Integrated Development of Horticulture (MIDH) by establishing model organic plots at farmers' gardens.</li> </ul>	<ul style="list-style-type: none"> <li>☆ Lack of package of practices for different agro ecological regions</li> <li>☆ Demands time</li> <li>☆ Less published and peer reviewed data to support organic movements, claims that organic farming increases sustainability</li> <li>☆ Lack of supportive policy framework</li> <li>☆ Lack of indigenous certification agencies</li> </ul>
<i>Opportunities</i>	<i>Threats</i>
<ul style="list-style-type: none"> <li>☆ Organic farming can make substantial contributions to sustainable environmental resource use</li> <li>☆ Possibility for group movement by trained farmers for practicing organic farming</li> <li>☆ High potential for women's participation in organic farming</li> <li>☆ Opportunity for tying organic farming with other goals notably with respect to biodiversity, gender inequalities and potentially global warming</li> </ul>	<ul style="list-style-type: none"> <li>☆ Organic farming poses threat to established agribusiness interests</li> <li>☆ Lack of adequate extension services and research capacity</li> </ul>

## 7. Strategies for Promotion of Organic Farming

It is well known fact that organic farming practices is suitable for small and marginal farmers especially for their livelihood security and free from debt trap. Sustainable resource base, sustained crop yields without over reliance on costly external inputs, protection of the environment and bio-diversity *etc.* are other major benefits. Sustained efforts from research institutes, developmental organizations, progressive farmers, inputs dealers, processors and other stakeholders are warranted for better adoption of organic farming in plantation crops. Based on the discussion with scientists, experts, farmers and other stakeholders, the following strategies have been formulated for promotion of organic farming in plantation crops like coconut, arecanut and cocoa:

1. Promotion of research on organic agronomic practices, bio-control of diseases and pests, bio-fertilizers *etc.*
2. Development of package of organic farming practices for coconut, arecanut and cocoa suited to different agro ecological regions of the country.

3. Organize seminars, workshops, symposium *etc.* for better interaction of the farmers with the scientists, extension workers, government officials for further upgradation of the technologies.
4. Organize organic farmers' network to exchange ideas, technologies *etc.*
5. Supply of bio-fertilizers, bio-agents, bio-pesticides and other organic inputs to small and marginal farmers in sufficient quantities at reasonable price as well as financial support by state and central governments to promote organic farming.
6. Farmers' participatory research for refining organic technologies for better adoption.
7. Establishment of model organic farming plots in different agro ecological regions.
8. Maintenance of data base at block/district level on area, production and productivity of different crops as well as organic nutrient resources and other materials needed for organic farming.
9. Simplification of certification processes, which are acceptable to small resource poor farmers.
10. Establishment of public warehouse for storage of organic farm produces as well as special marketing zones for organic products to promote domestic sales/export.

## 8. Conclusion

It is apparent from the results that the farmers who have implemented the organic farming practices do reflect the concern for sustainable agriculture. It becomes much more evident from the apprehensions expressed by the farmers regarding soil fertility, environmental impact and health hazards. Strikingly farmers also revealed the flexibility and freedom they might enjoy by minimal dependence on external agencies as an incentive of practicing organic farming. It is noteworthy that most of the farmers do not have awareness and expertise on advanced organic farming practices such as application of bio pesticides and bio fertilizers, which could be a point of intervention from the researcher front.

As a matter of fact, the organic farming culture in our country is experiencing a transition regime and yet to be evolved as an organized practice, especially in the case of perennial crops like coconut, arecanut and cocoa. Lack of good quality organic inputs, timely availability of the inputs and higher transaction costs, *etc.* are the important matters of concern from the farmer front. Possibility of occurrence of nutrient deficiencies/pests and diseases due to organic farming practices and appropriate management approaches is another area of concern. While proposing shift to organic farming, it is imperative to recommend a comprehensive package. Therefore, the lack of organized set up and inadequate infrastructure with meagre policy support might hamper the interest of those who are seriously practicing organic farming.

Farmers are more confronted with market-related difficulties such as low and highly fluctuating prices and it is a challenge to find favourable market outlets for the products. To realize the higher prices for organic produce it is imperative to obtain organic labeling for the product. Organic certification is certainly a cumbersome procedure and to materialize this, organic producers should join together as an Organic Producer's Society. The certification may be attempted through Participatory Guarantee Systems (PGS) which are locally focused quality assurance systems. They certify producers based on active participation of stakeholders and are built on a foundation of trust, social networks and knowledge exchange. Moreover, the Government of India supports PGS through the National Centre of Organic Farming (NCOF).

From the policy front it is of paramount importance to set up separate marketing facilities for organic produce through the existing channels of marketing of agriculture products such as the Amul/Milma, Supplyco and Horti-corp. From the researcher's point of view the vital challenge is to bridge the information asymmetry existing between farmers and the policy makers. Nevertheless, the concerted efforts from stakeholders of organic farming would ensure the sustainable cultivation and would also attract economic benefit. Above all, Product labeling (organic) followed by branding can open up a possible niche- international market for the organic product in the long run.

### Selected References

- Jaganathan, D. (2009). A multidimensional analysis of organic farming in Tamil Nadu. *Ph.D., thesis*, Indian Agricultural Research Institute, New Delhi.
- Jaganathan, D., Thamban, C., Jose, C.T., Jayasekhar, S. and Anithakumari, P. (2013). Analysis of organic farming practices in coconut in south India. *Journal of Plantation Crops*. 41(1): 71-89)
- Jaganathan, D., Thamban, C., Jose, C.T., Jayasekhar, S. and Chandran, K. P. (2014). Analysis of organic farming practices in arecanut in south India. *Book of Abstracts*. National conference on Sustainability of coconut, arecanut and cocoa farming – Technological advances and way forward. 22-23<sup>rd</sup> August, 2014, CPCRI, Kasaragod, p. 112.
- Jaganathan, D., Thamban, C., Jose, C.T., Jayasekhar, S., Chandran, K.P. and Muralidharan, K. (2015). Analysis of organic farming practices in cocoa in India. *Journal of Plantation Crops* 43(2): 131 -138.
- John, F.(2000). Prospects for conventional farmers adopting organic production techniques. In: *Organic farming in New Zealand: An evaluation of the current and future prospects including an assessment of research needs*. Ministry of Agriculture and Forestry, New Zealand. [www.maf.govt.nz](http://www.maf.govt.nz).
- NCOF. (2011). *National Project on Organic Farming. Annual report (2010-2011)*. National Centre of Organic Farming, Ghaziabad, 88 p. ([www.dacnet.nic.in/ncof](http://www.dacnet.nic.in/ncof))
- Thomas George, V. (2010). Technological advances in organic farming of plantation crops. In: *Organic horticulture- Principles, practices and technologies*. (Eds.) Singh,

H.P and Thomas George V., Westville publishing house, New Delhi, pp. 32-47.

Thomas George, V., Subramanian, P., Krishnakumar, V., Alka Gupta and Chandramohanam, R. (2010). Package of practices for organic farming in coconut. Technical bulletin No. 64, CPCRI, Kasaragod, Kerala, 28 p.

Veeresh, G.K. (1997). *Organic farming and its relevance to present condition*. Agriculture Man and Ecology, Bangalore, 115 p.